a.

2013 Cotile Lake Aquatic Vegetation Control Plan

Waterbody type – Wooded impoundment

1. Age and condition of control structure – Built in 1965 – Cotile Lake Dam is fulfilling its intended purpose as per DOTD inspection dated 2011. See appendix II.

   The overall condition of the dam is satisfactory.
   The following deficiencies were found by the inspection team:
   There was a seepage area located at station 45+00 to station 49+00 along the toe of the downstream of the dam, approximate1y 10 feet wide by one foot deep.

   Cotile Lake has two structures that are utilized to release water out of the lake. The Bayou Jean de Jean drawdown structure was repaired in 2011. The gate stem on the single gate structure was replaced and is currently in working order. This structure is used to drain water from the lake for drawdown purposes. Water draining out of this structure flows into the Red River.
   The Bayou Rapides structure is also a single gate structure. It is used to release water into Bayou Rapides. This water is utilized by Rapides Parish farmers for irrigation. The gate stem on this structure was replaced in March of 2013 and it is currently working as designed.

2. Type of control structure - The earth embankment is approximately 5,870 feet long having 3 to 1 side slopes with soil cement slope protection on the upstream slope and a crown width of 15 feet at an elevation of 118.0 feet MSL. On the lake side, there is a 10 feet wide berm at an elevation of 96.0 feet MSL. The downstream berm at an elevation 95.0 feet MSL is 10 feet wide increasing to the width of 20 feet near the irrigation structure end of the embankment. There is an earth plug in an old trench 12 feet wide at the bottom with 1 to 1 side slopes and varying depths which was dug at approximately 40 feet upstream of the dam centerline. There is an embankment foundation drain on the right abutment (facing downstream), which discharges into Cotile Creek located near the 30-foot berm. There are also seven relief wells on each side of this same 30-foot berm.

   Dam height is 31 feet.
   Structure height is 36 feet.
   Hydraulic height is 31 feet.
   Maximum discharge is 45,250 cubic feet/ second
   Maximum storage is 49,200 acre-feet.
   Normal storage is 25,000 acre-feet.
   Surface area is 1775 acres.
   Drainage area is 40.75 square miles.

3. Water level range (MSL)- 105.6 MSL

4. Surface area range – 1,775 acres

5. Average depth – 10 ft Avg – 28 ft Max
6. Watershed ratio – 13.9 : 1

7. Drawdown potential of structure - 16 feet
8. Waterbody Board or Lake Commission – Rapides Parish Police Jury
Primary contact information- Rapides Parish Police Jury
P.O. Box 1150
Alexandria, LA. 71309
318-473-6660
318-473-6670 - fax
http://www.rppj.com

Procedure for spillway openings – The RPPJ opens the gates as needed to provide downstream irrigation. Gate openings at the request of LDWF for habitat or fisheries management purposes must be approved by RPPJ.

DRAWDOWN HISTORY				
Gate Opened	Gate Closed	Purpose	Results	Issues
Summer 1987	Fall 1988	Spillway repairs	Unknown	unknown
Sept 6, 2001	Jan 1, 2002	Vegetation control	Excellent	10' down
Sept 1, 2007	Jan 31, 2008	Bridge repair/veg. control	Excellent	10' down

The Rapides Parish Police Jury, through interagency agreement with the Soil Conservation Service, is responsible for the maintenance and operation of the impoundment. The Police Jury has established a dedicated irrigation pool drawdown to 92.5 MSL (top 13 feet of water) if needed to meet agricultural needs by route of Bayou Rapides.

9. What significant stakeholders use the waterbody?
The reservoir was built to provide water for agriculture irrigation which is designated as the first priority. The Rapides Parish Police Jury, through interagency agreement with the Soil Conservation Service, is responsible for the maintenance and operation of the impoundment. The Police Jury has established a dedicated drawdown pool to 92.5 MSL if necessary to meet agricultural needs by route of Bayou Rapides.
Cotile Lake is heavily utilized for recreational activities. Pleasure boating, fishing, hunting, skiing and swimming are common activities. Cotile Lake Recreation Area is located on the shoreline of the reservoir and is owned and operated by the Rapides Parish Police Jury. The recreation area is used extensively for camping. It also has a designated swimming area and a 4 - lane concrete boat launch. Further information concerning the lake can be found at the following link. http://www.hikercentral.com/campmaps/105339map.html

Approximately 40 percent of the shoreline is developed with homes and camps.

10. What are their needs and concerns? What is the history of aquatic vegetation complaints?

Vegetation complaints have been sporadic. Complaints become more numerous as submergent vegetation increases in coverage. Complaints became numerous in the summer of 2001 due to extensive submergent vegetation. A fall/winter drawdown in 2001 reduced the vegetation and complaints. In fall/winter of 2007 the lake was drawn down by the Rapides Parish Police Jury for repairs to the Hoyt road bridge. This drawdown was beneficial in reducing submergent vegetation. Following the fall/winter drawdown of 2007 complaints were minimal until the summer/fall of 2012.

11. Have there been any controversial issues on the lake?
Since the first priority of the reservoir is providing water for irrigation, drawdowns are always of concern to the RPPJ. Muddy water problems caused by heavy colloid sludge coming from an abandoned gravel pit in the watershed were corrected in 1984. The Cotile Lake Environmental Association promoted vegetating of the old pit area which resulted in improved runoff into Cotile Lake.

Aquatic Vegetation Status:

As of July 25, 2012 the majority of Cotile Lake was clear of problem vegetation. However, the Williamson Arm area of the lake was infested with hydrilla. Approximately 200 acres of hydrilla were matted to the surface and were restricting fishing and boating access. Numerous complaints have been received from home and camp owners from this area of the lake. Without control measures, the existing hydrilla has the potential to spread throughout the lake. Since 2001, Cotile Lake has been plagued by hydrilla. At one point in the early 2000's approximately 40% of the lake was covered with submergent vegetation, primarily hydrilla. At the time of the survey, there were less than 100 acres of giant salvinia and less than 100 acres of water hyacinth along the fringe of the lake. Other vegetation observed included American lotus, white water lily and pondweeds. The combined acreage of these species is less than 100 acres. A narrow fringe of panicum was observed along the shoreline around the majority of the lake. It helps reduce shoreline erosion and provides limited habitat for fish.

Vegetation coverage for 2013 is expected to be similar to that found during the 2012 vegetation survey. However, hydrilla is expected to increase in coverage without control measures. Coverage of hydrilla may increase to 400 acres by the fall of 2013.

A vegetation survey was conducted on March 20, 2013 in the Williamson Arm and nearby coves. Hydrilla was greatly reduced compared to the survey in July 2012. This is attributed to the recent high water and the associated increase in turbidity that occurred. Hydrilla was observed, however it was primarily scattered fragments and no mats were present. It was not restricting boating access in the area surveyed. This same area in the Williamson Arm was matted to the surface with hydrilla in the fall 2012 vegetation survey. At that time boating access was greatly impeded in this area. The 2012 type map is attached below.

Limitations:

Cotile Lake was created to provide water for irrigation. The top 13 feet of water in the lake are dedicated for irrigation. All other uses of the impoundment or management action, including drawdowns and herbicide applications are secondary to this primary function.

The lake is owned by the Rapides Parish Police Jury

Past Control Measures:

Past control efforts have included two drawdowns since 2001 and regular applications of foliar herbicides. Since 2008 when giant salvinia was discovered, herbicide applications are required a couple of days each month. The history of spray efforts and a list of common herbicides and application rates are listed below.

Aquatic Vegetation Control

Year	Acres	Vegetation
2006	125	Common Salvinia
	63	Water Hyacinth
2007	1	Alligator weed
	21	Common Salvinia
	7	Water Hyacinth
2008	43	Alligator Weed
	60	Common Salvinia
	38	Giant Salvinia
	67	Water Hyacinth
2009	36	Alligator Weed
	13	Common Salvinia
	92	Giant Salvinia
	16	Water Hyacinth
2010	24	Alligator Weed
	5	American Lotus
	110	Giant Salvinia
	7	Water Hyacinth
2011	8	Alligator Weed
	5	Common Salvinia
	169	Giant Salvinia
	1	Water Hyacinth
2012	18	Alligator weed
	17	Common Salvinia
	365	Giant Salvinia
	31	Water Hyacinth

Herbicides have been applied at the following rates:

Glyphosate (Aquamaster, Aquastar, etc.): Used at a rate of 0.75 gallons per acre to treat alligator weed, water hyacinth, and giant and common salvinia during the active growing period.

Diquat (Reward, Knockout): Used at a rate of 0.75 gallons per acre to treat alligator weed, water hyacinth, and giant and common salvinia during the slower growing period or winter months.

Imazapyr (Ecomazapyr, Polaris): Used at a rate of 0.5 gallons per acre to treat alligator weed and water primrose.

Surfactant is added at a rate of 1:4 (surfactant: herbicide) for all herbicides.

Recommendations for 2013:

Annual surveys are scheduled to document aquatic vegetation coverage (type maps). These surveys will be conducted in July or August. Aquatic technicians will also report significant changes in the status of aquatic vegetation following days of spraying activity.

LDWF spray crews will continue spraying emergent vegetation 2 to 4 days per month with glyphosate or diquat and an approved surfactant. These herbicides will be applied at the rate of .75 gallons per acre with the surfactant applied at 0.25 gallons per acre. Alligator weed will be treated with Imazapyr at 0.5 gal/acre with Inergy surfactant added at 0.25 gal/acre. Water hyacinth will be treated with 2, 4-D at 0.5 gal/acre.

Future herbicide applications for the treatment of giant and common salvinia will be in accordance with the following:

April 1-October 31: glyphosate (0.75 gal/acre)/diquat (0.25 gal/acre)/Aqua King Plus (0.25 gal/acre)/ Thoroughbred (8 oz./acre)

November 1 – March 31: diquat (0.75 gal/acre)/surfactant (0.25 gal/acre)

Herbicide applications can provide reductions in hydrilla biomass. Unfortunately, herbicide applications to submerged vegetation are short-lived and cost prohibitive. Triploid grass carp (TGC) have been used in some Louisiana waterbodies to provide effective long term control of submergent vegetation. Introduction of triploid grass carp are recommended for Cotile Lake as described below:

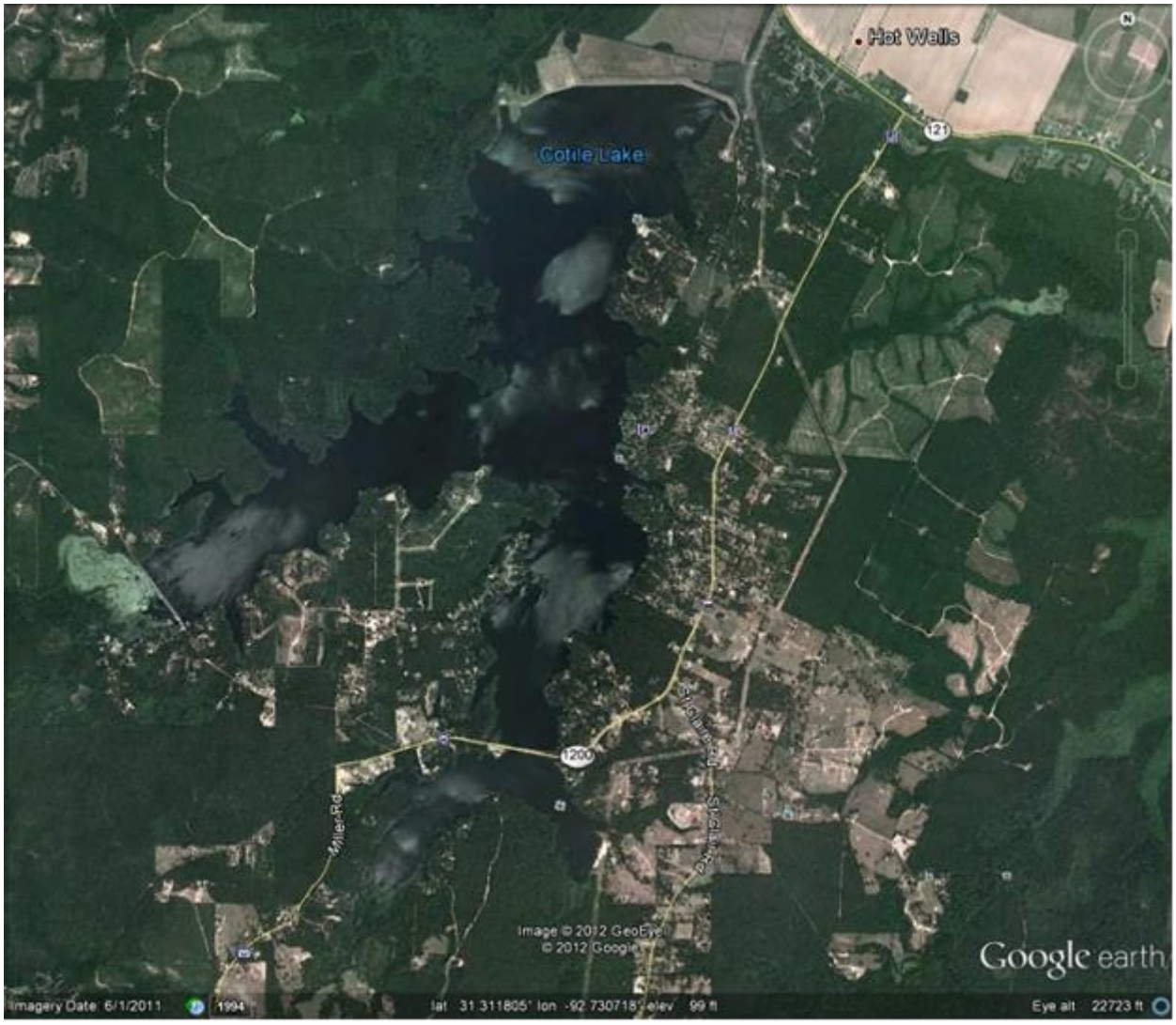
1. TGC should be stocked at a rate of 5 fish per acre of submerged vegetation for an estimated number stocked of 1,000.
2. To reduce loss from predation, stocked TGC should be at least 12 inches in length.
3. To increase survival of stocked TGC, stocking is to occur in early spring when the Cotile Lake water temperature is at, or below 70^0 F.

4. TCG should be stocked in Spring 2013 to take advantage of reduced hydrilla coverage as a result of the recent natural water level fluctuations.
5. TGC should be stocked in the Williamson Arm area of the lake at the Hoyt Road Bridge.

A fall/winter drawdown may be recommended in 2013. This decision will be determined by the amount of hydrilla regrowth. A vegetation survey will be conducted in July 2013 to assess hydrilla regrowth and determine if it is restricting recreational use of the lake. If hydrilla coverage returns to the level found in the July 2012 vegetation survey (≈ 200 acres), a drawdown will be recommended. If the drawdown is determined to be necessary, to following recommendations would apply:

A. Lower the lake water level at a rate of four (4) inches per day to a maximum of 6 feet below pool stage. This will ensure adequate available water in the lake for irrigation purposes and minimize the inconvenience to lake users and residents.
B. Begin the drawdown in early September after Labor Day to allow for maximum recreational opportunities.
C. Close the gates no later than January 15, 2014. This will allow the lake time to return to normal pool level prior to the fish spawn and ensure adequate water available for spring/summer irrigation.

Appendix I – Map of Cotile Lake



Appendix II – Photographs of control structure.

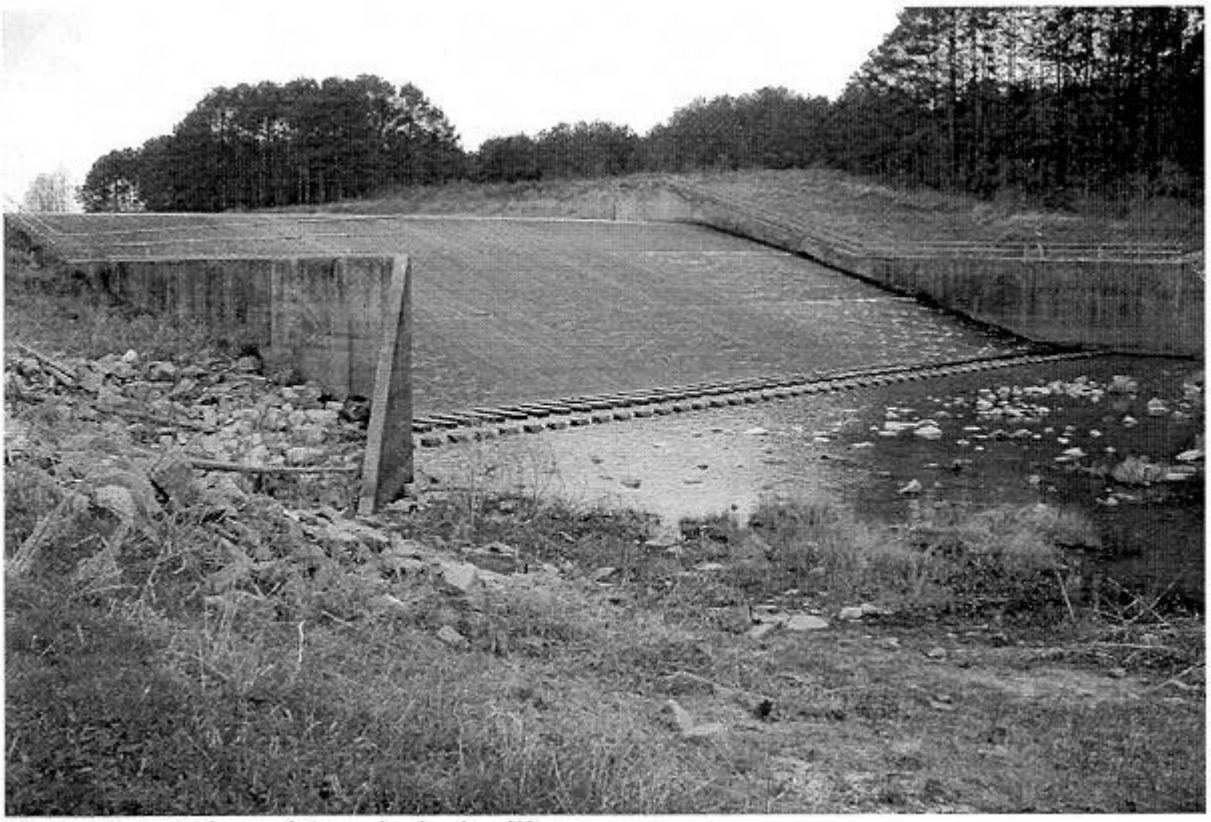


Photo No. 1: View of the principal spillway

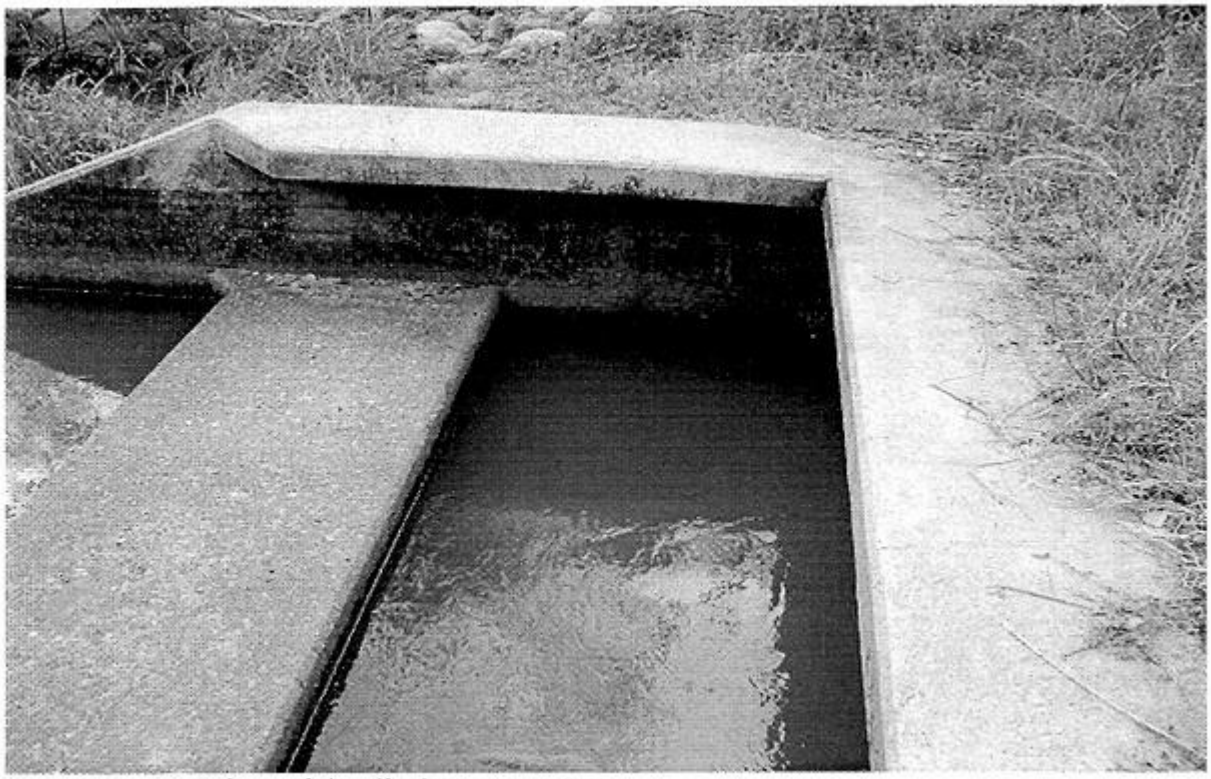


Photo No. 10: View of the discharge structure.

Photo No. 2: View of the principal spillway

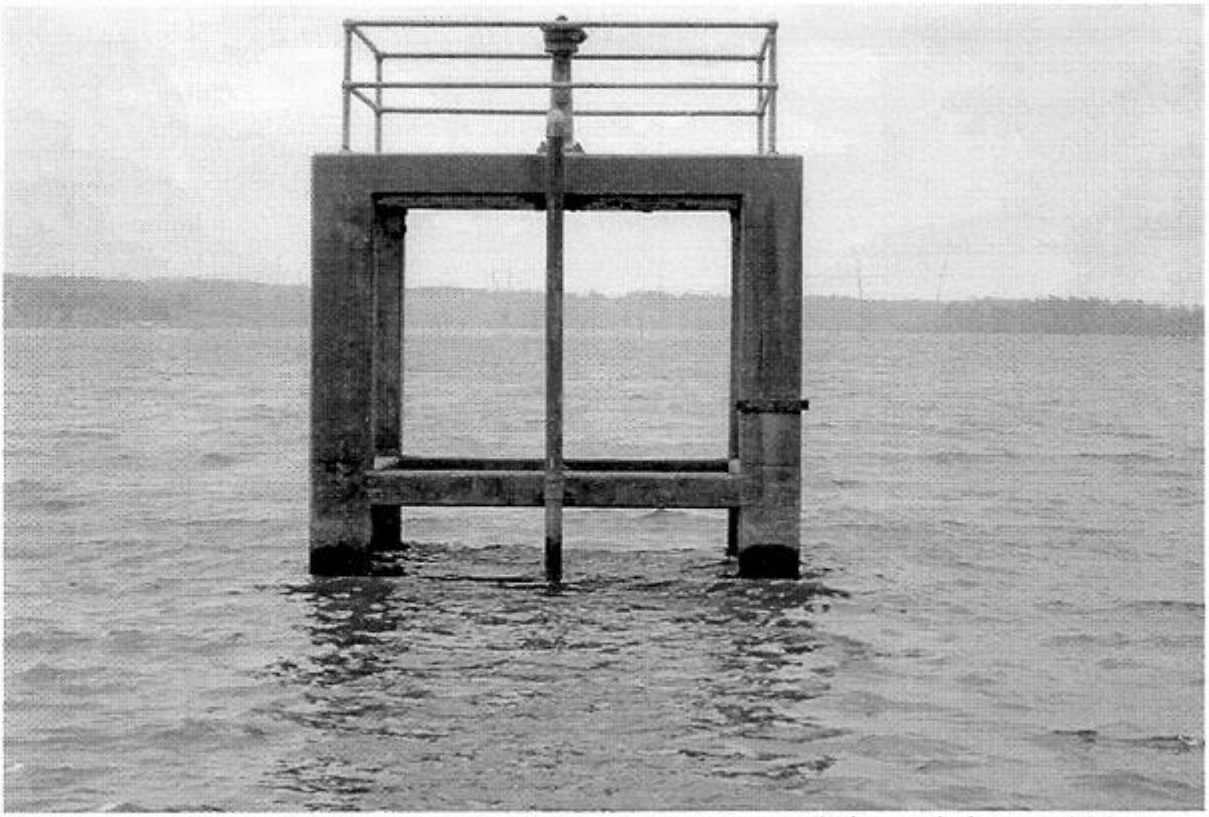
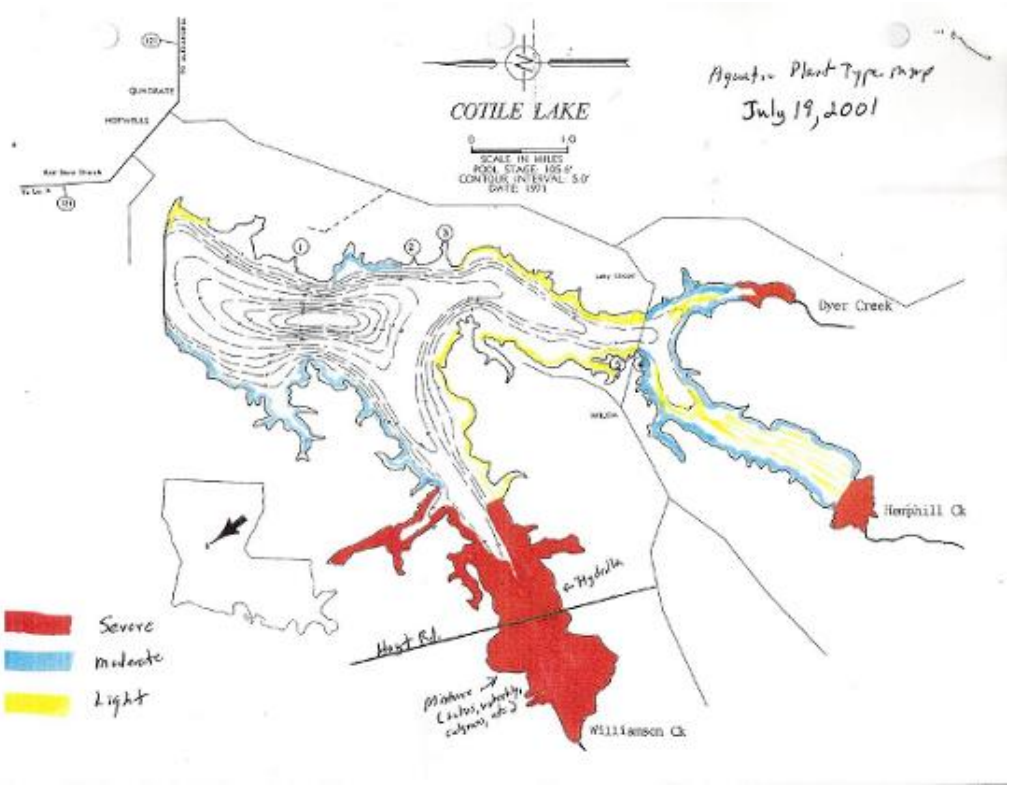


Photo No. 5: View of the Bayou Jean de Jean Inlet structure (this one is inoperable).

Photo No. 3: View of the 60 inches diameter (inside diameter) 320 foot long discharge reinforced concrete pipe culvert.

Typemap



July 30, 2001

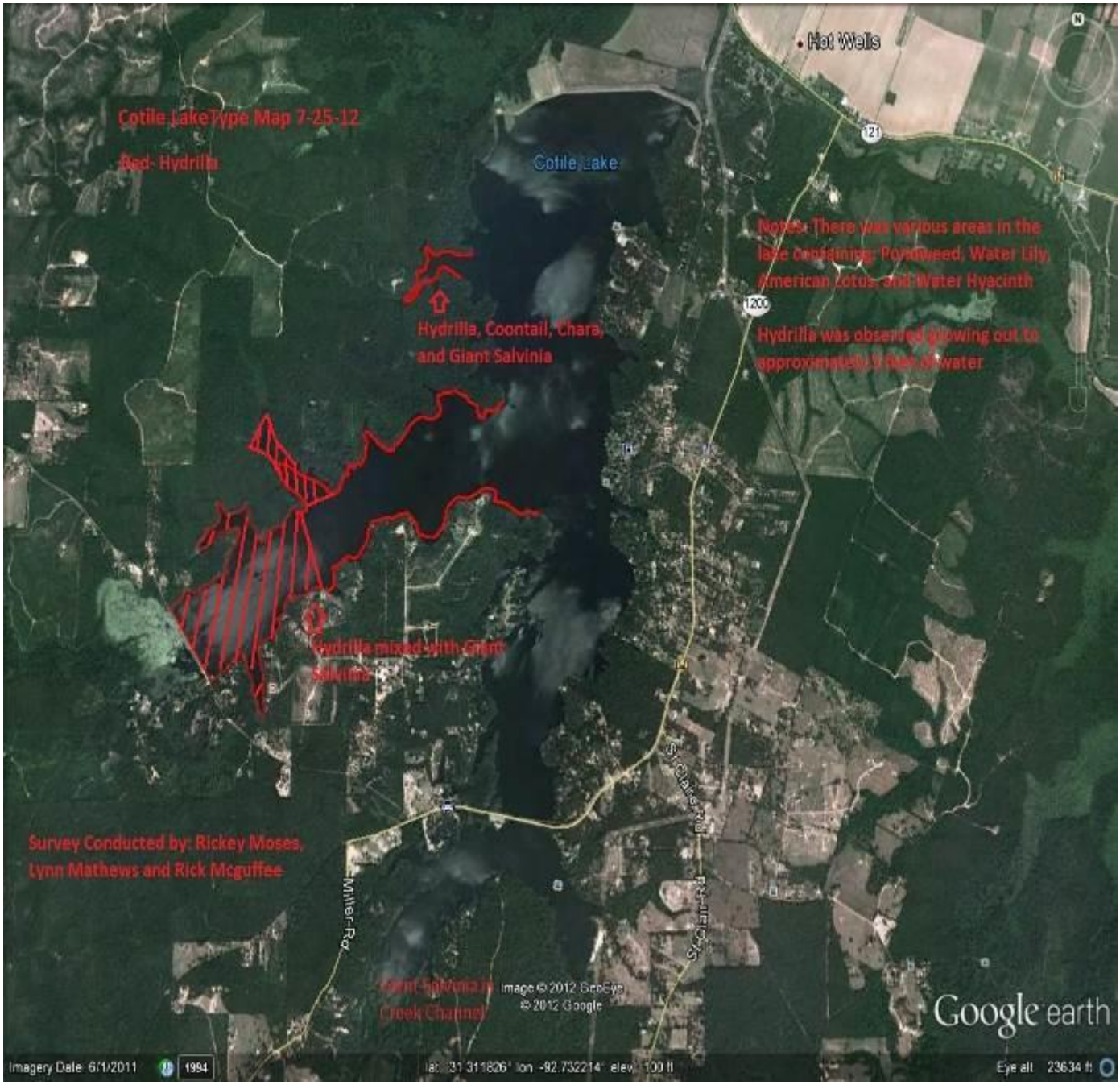
Cotile Lake was surveyed July 19th for the purpose of mapping aquatic weed problem areas, identifying problem species, and noting trends in levels of infestation from previous surveys. Comparing aquatic weed problems from the 2000 year survey with current conditions, the problem species had not changed, but Hydrilla showed a significant increase in coverage.

The Williamson Creek arm of Cotile Lake west of Hoyt road had a serious infestation of aquatic weeds. The major problem species in this area were white water lily, American lotus, water milfoil, coontail, cabomba, water primrose, and bladderwort. Large stands of cutgrass and elephant ear lined the banks of a small boat road to several residences. This aquatic weed mixture was very dense and made 95% of these waters unusable for fisherman, boaters, and hunters.

The Williamson Creek arm of Cotile Lake east of Hoyt road also had a serious infestation of aquatic weeds. Hydrilla was the dominant aquatic plant in this area and was rooted in waters up to 11 feet. Hydrilla showed a definite increase (30%) in coverage from the previous year and is beginning to seriously restrict water use. Watermilfoil was the second most abundant species followed by cabomba, coontail, bladderwort, American lotus, and water primrose. The residents in the Caroline Drive area are experiencing extreme difficulty in getting to the main body of the lake by boat because of aquatic weed growth.

The Hemphill and Dyer Creek areas of the lake have a moderate to light infestation of aquatic weeds. Hydrilla, watermilfoil, pondweed, coontail, cabomba, and water hyacinth were the most common plants in this area infesting approximately 15 to 20 percent of the water south of Hwy 1200. The Hydrilla infestation in this area showed no increase from the previous year survey.

Type Map 2012 (Conducted on July 25, 2012)



Vegetative Type Map 2012

A vegetation survey was conducted on Cotile Lake on July 25, 2012. Overall the lake was in good condition. South of Hwy 1200 giant salvinia was scattered, no large mats were observed. North of Hwy 1200 giant salvinia was observed scattered throughout the lake. It was very sporadic and no

mats were observed. Total coverage in the lake was less than 50 acres.
Water hyacinth was found scattered throughout the lake; giant salvinia was usually mixed with it. There were no mats of water hyacinth and total coverage in the lake was less than 100 acres.
Other vegetation observed included American Lotus, white water lily, and pondweed. Acreage for these species combined was less than 100 acres.
There is a narrow fringe of panicum along the majority of the shoreline. This provides benefits by reducing shoreline erosion and providing fish habitat.
The only serious vegetation problem on the lake is in the west end Williamson Arm. There is approximately 200 acres of hydrilla that is matted to the surface in this portion of the lake. It is causing serious access problems for home and camp owners. See map above.

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